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ABSTRACT

To prepare students for a total quality workplace, South Piedmont Community College (SPCC) is offering hands-on projects for students to learn the following skills: learning to learn; listening and oral communications; competence in reading, writing, and computation; adaptability, which includes creative thinking and problem solving; personal management, which addresses self-esteem, goal setting, motivation, and personal/career development; group effectiveness, covering interpersonal skills, negotiation, and teamwork; and organizational effectiveness and leadership. Some tasks that the students encounter during the projects are job applications, reports, deadlines, periodic reviews/presentations, and independent contracts. All assignments culminate in a final presentation where students present a summary of their work and a demonstration of their final product. A new focus of the projects centered on the desire to create win-win situations for all those involved: students receive credit for required classes along with valuable work experience, and the local businesses gain a solution to a technology-related problem without the cost of labor. (JA)

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Creating Win-Win Capstone Projects

By Gornie T. Williams, Jr.

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To prepare students for a total quality workplace, certain initiatives must be undertaken to ensure that each student has the necessary skills to succeed. One way South Piedmont Community College (SPCC), is accomplishing this, is through teaching the use of quality principles and techniques in a hands-on project environment. During these projects a premium is placed on students learning and applying the following skills[1]:

1. Learning to Learn.
    - Employers are more frequently shifting employees between jobs and responsibilities, "putting a premium on the ability to absorb, process and apply new information quickly and effectively."
2. Listening and Oral Communications.
    - Fifty-five percent of time spent in communicating is spent listening, but schools offer "scant instruction" in oral communication or listening.
3. Competence in Reading, Writing, and Computation.
    - "Most employers today cannot compete successfully without a workforce that has sound basic academic skills." Although schools frequently teach isolated reading, writing, or computational skills, use of these skills on the job will require additional proficiency in summarizing information, monitoring one's own work, and using analytical and critical thinking skills.
4. Adaptability: Creative Thinking and Problem Solving.
    - An organization's ability to succeed depends on using creative thinking to solve problems and overcome barriers, thus placing a premium on workers who develop such skills.

5. Personal Management: Self-Esteem, Goal Setting/Motivation, and Personal/Career Development.
    - Taking pride in work accomplished, setting goals and meeting them, and enhancing job skills to meet new challenges are necessary characteristics of employees. "Unfortunately, the educational system provides little formal training to develop such attributes."
6. Group Effectiveness: Interpersonal Skills, Negotiation, and Teamwork.
    - The ability to work cooperatively in teams is increasingly important for workplace success.
7. Organizational Effectiveness and Leadership.
    - Employers want employees to "have some sense of where the organization is headed and what they must do to make a contribution … and who can assume responsibility and motivate coworkers."

Some tasks the students encounter during the projects are job applications, reports, deadlines, periodic reviews/presentations and independent contracts. All assignments culminate in a final presentation where representatives from each group present a summary of their work and a demonstration of their final product to an audience of their peers, instructors, administrators of the college and other state officials or company representatives.

In the first annual project students in the computer programming curriculum built and programmed a welding robot prototype. The Computer Aided Drafting & Design (CAD) students were contracted to create blue prints for the robots construction and the Commercial Art students were contracted to create an advertising campaign and marketing proposal.

In the second annual project students from the same curriculums listed above, designed, built and created advertisement for a programmable robot prototype that would transport palletized goods throughout a warehouse. However, this project was different in that additional curriculums were involved. From the Job Vocational Readiness class a student[2] was "hired" to work as part of the computer programming curriculum team to build and program the robot. The Electrical Wiring class was contracted to wire the robot and the Carpentry class was contracted to build a model of the warehouse in which the robot would demonstrate its capabilities. The project was featured in the local newspaper.

The third annual project involved several curriculums: The project emulated the proposed 2005 NASA Mars mission, including development of a programmable robot rover, a scale model of the planet's surface and a rocket to deliver and retrieve the rover. Students from the CAD class created working drawings of a space shuttle and a Mars probe rocket. Additionally, a model of the Mars probe rocket was constructed from which the robot rover could demonstrate its capabilities. Carpentry students were contracted to create a frame for the model Mars probe rocket. Electrical Wiring students were contracted to created an electrical elevator mechanism to deliver the robot rover from the Mars probe rocket to the planet surface. Computer Programming students built and programmed a model robot rover with a camera and a mechanical arm for retrieving rock specimens. Accounting students computerized the "student formed" companies accounting process and GED students used the essay portion of their class to write about how the various curriculums participated in the project.

The lead instructor for the project, Gornie T. Williams Jr., submitted a proposal concerning the project to the League for Innovation in the Community College and was invited to lead a forum at their Innovations '98 international conference. While there he provided detailed

information about student involvement in the project and he also demonstrated the robot rover's capabilities.

This 1999 project year was very exciting. Due to the widespread success of previous projects, several changes took place. The focus of the projects changed because local businesses asked to participate. Additionally, there was an increase in the number of students who became involved.

The new focus centered on the desire to create win - win situations for all those involved in the projects. Local businesses, seeing the quality of work performed by project students asked for students to help them solve their technological problems. During the projects, students receive credit for required classes along with valuable work experience and the businesses gain a solution to a technology-related problem without the cost of labor.

The increase in students created a need to expand the number of projects. During the 1999 school year there were four projects:

- Telecommunications Project - W.R. Bonsal, a successful local company, with eleven branches in various states, agreed to allow a student group to solve one of its telecommunication problems. The company desired to be able to videoconference with all of its sites to improve the way meetings were conducted and reduce barriers to communication.
- Website Project - Anson Apparel, a local apparel business, wishing to expand their marketing and customer service capabilities, agreed to allow a student group to create a website for their company.
- Smart-House Project - Selectronics, a local company who deals with innovative technologies for homes and businesses agreed to supply the students with the

technology they need to build a scale model of a computer automated home. Additionally, the students conducted research to determine the market for such homes in our area.

- Database Project - The SPCC corrections education department was using an antiquated database to keep track of their class offerings and students. The student group analyzed the current system and designing a new one.

The lead instructor for these projects, Gornie T. Williams Jr., submitted a proposal to the National Institute for Staff and Organizational Development and was invited to lead a forum at their 1999 international conference. While there he provided detailed information about the students involvement in the projects. Additionally, he also held a live videoconference, using the student designed videoconference system, in which the audience got a chance to talk with the presidents of SPCC, Dr. Donald P. Altieri, and the Vice President of Operation for W.R. Bonsal, Mr. David Maske.

The year 2000 promises to be a project year to remember. Students are already hard at work exploring possible project opportunities, about which, instructor Williams will lead a forum at The International Conference on College Teaching and Learning later this year. In summary, to quote instructor Williams, "It is no longer enough to simply believe that excellence is the state of being the best at what you do. Today, excellence can only come through the continuous use of quality improvement tools and techniques that bridge the gap between what we offer our customers and what they really need." For SPCC, this excellence is achieved through the use of hands-on projects.

[1]Source: David Langford, Quality Learning Training Manual, 1996 Langford International, Inc.

[2]Fermin Gomez, after participating in the project, decided to further his education. He graduated in May of 1999 (Cum Laude), with a degree in Information Systems - Programming.